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Presidential address
Experts and publishers: writing popular science in early twentieth-century Britain, writing popular history of science now

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Abstract. The bulk of this address concerns itself with the extent to which professional scientists were involved in popular science writing in early twentieth-century Britain. Contrary to a widespread assumption, it is argued that a significant proportion of the scientific community engaged in writing the more educational type of popular science. Some high-profile figures acquired enough skill in popular writing to exert considerable influence over the public's perception of science and its significance. The address also shows how publishers actively sought 'expert' authors for popular material, but at the same time controlled what was published in accordance with their perception of what would sell. At a more popular level of writing there were many semi-professional authors who, while not active scientists, exploited close contacts with the scientific community. Here there was a strong emphasis on the practical applications of science.
The address concludes by suggesting parallels between popular science writing in this period and the present state of popular writing about the history of science.

In 2003 in York my presidential predecessor Janet Browne enthralled us with her analysis of Darwin as a subject of caricature and cultural symbolism. Knowing that there is a pop group named 'Darwin' finally cleared up the mystery of why his name was picked out in stones on a mountainside in the Gran Sasso above L'Aquila in Italy. I begin with an apology to any who hoped for a follow-up presidential address on anti-Darwinism. Despite my long interest in those who rejected or evaded Darwin's insights on evolution, I have moved on to more general studies of the relationship between science and society in early twentieth-century Britain. After spending some time looking at the ongoing debates on science and religion in that period, I have now begun to take a more general interest in how science is presented to the public. Having seen that a number of scientists participated in the theological debates, I began to wonder about the frequently expressed assumption that by 1900 science had become so professionalized and so specialized that it was either impossible or unfashionable for scientists to address the general public on the implications of what they were doing. If some of them were willing to argue about the religious, moral and philosophical implications of their work, then perhaps there was a wider dimension of popular science writing in which scientists were still willing and able to participate. Perhaps Julian Huxley and Arthur

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Eddington were not anomalies in their ability to attract wide public attention, but merely the tip of an iceberg of literary talent being applied in an area which, according to the accepted view, scientists had voluntarily abandoned once T. H. Huxley, John Tyndall and their ilk had made their point against the Victorian churches.

In this address I first examine the origin of the belief that scientists deliberately turned their backs on non-specialist writing as the scientific community became more professionalized. We have been misled, in part by assumptions about the extent and the very nature of professionalization and in part by the criticisms of a later generation of socially concerned scientists. Although there were specific circumstances in which popular writing could damage a scientist's professional standing, these were not such as to forbid a limited participation in projects which were seen to have educational merit or publicity value for science as a whole. Second, I demolish the very idea of an isolated scientific community by showing not only that large numbers of scientists did write for a non-specialist audience, but also that publishers actively sought authors with a level of expertise which allowed them to stress the educational value of their books. This will require some analysis of the different ways in which publishers sought to satisfy what they perceived to be an ever-increasing demand by ordinary people for information about science. It will also force us to think a bit more carefully about what counted as expertise in this market; professional training and a position as an academic or industrial researcher were valid sources, but there were writers who somehow managed to acquire the standing of 'experts' even though they were not active members of the scientific community. There was also the balance between expertise in science and the ability to write for a non-specialist reader. Many scientists could write material accessible to the reader seeking informal education, but books and articles where entertainment was the main priority required a different skill which few scientists could find the time to learn. Here the market was dominated by writers who had no formal scientific credentials, although some had a level of informal expertise. Newspaper journalists seldom understood science, at least until J. G. Crowther and Ritchie Calder created the role of specialist science correspondent in the 1930s.

This leads to my final point, in which all pretence at offering an academic historical exercise is abandoned and I shamelessly exploit my position to conclude with some under-researched and entirely personal observations about the present state of popular writing in our own field. I am not so bold as to comment on modern popular science writing, but I do keep an eye on the popular books which are published in the history of science. There are some interesting parallels between the early twentieth century and the current state of affairs. What we had then in popular science writing and have now in the history of science is a situation in which expertise was something which could be negotiated between author and public, with the publisher as the arbiter of what the public was perceived to want. If there are tensions here between academic and non-academic authors, they are tensions which have arisen before. Those of us who are interested in promoting our discipline outside as well as inside the walls of academia might profitably gain from thinking about their origin.

The myth of the isolated professional

My first job is to identify the nature and source of the misconception that as science became more professionalized around 1900 its practitioners abandoned the Victorian tradition of engagement with the public. Campaigners such as T. H. Huxley had participated as public intellectuals in the great debates of the time, arguing the case for scientific naturalism and for a greater use of science in the nation's affairs. They were much less successful in the latter aim than they had hoped, but the scientific community did slowly expand as more jobs became available in education, government and industry. This new generation of professional scientists now turned its back both on the role of the public intellectual and on the effort to teach ordinary people about science by writing non-specialist accounts of the latest developments. They were unwilling to learn the trade of the journalist and unwilling to abandon the technical jargon of specialized research in order to communicate with non-scientists. They were increasingly suspicious of the few who did try to write at this level. It became damaging to one's career prospects to be seen as someone who wasted precious research time on such frivolous activities. Scientists retreated into their laboratories, content to be the passive servants of government and industry, and suspicious of the journalists who knocked on their doors looking for new discoveries to sensationalize.

This image of professional isolation was articulated some years ago by another of my predecessors, David Knight.[1] It is easy to see where it comes from. Roy MacLeod's well-known article on the International Science Series showed how this flagship project of Huxley's generation foundered towards the end of the century. Here was a self-conscious effort to encourage scientists to write for a general audience. But in 1891 the publisher, Kegan Paul, complained to Sir John Lubbock that sales were low because the books were too specialized for ordinary people to read.[2] To reach the general public, the language would have to be even more savagely pruned of the technicalities that were the meat and drink of specialist scientific discourse. Everyone accepted that technical terms were a barrier to communication with non-specialists, although this included scientists in other fields. Commentators from outside the scientific community, including J. W. N. Sullivan and Gerald Heard, thought that the scientists actually welcomed the air of superiority and mystery conferred by the resulting sense of lofty isolation. Heard also suspected that the scientists did not want outsiders to realize that their much-vaunted method still included a large amount of intuition.[3]

1 D. Knight, 'Getting science across', *BJHS* (1996), **29** 129–38; see also Knight, 'Scientists and their publics: popularization of science in the nineteenth century', in *The Cambridge History of Science, Volume 5: Modern Physical and Mathematical Sciences* (ed. M. J. Nye), Cambridge, 2003, 72–90.

2 Quoted in R. MacLeod, 'Evolutionary internationalism and commercial enterprise in science: the international scientific series, 1877–1910', in *Development of Science Publishing in Europe* (ed. A. J. Meadows), Amsterdam, 1980, 63–93, 79. The article is reprinted with the original pagination in MacLeod, *The 'Creed of Science' in Victorian England*, Aldershot, 2000.

3 J. W. N. Sullivan, *Aspects of Science*, London, 1923, 14–17; Gerald Heard, *This Surprising World: A Journalist Looks at Science*, London, 1932, 12–14.

We are left to assume that few scientists were willing to demean themselves by trying to translate the language of the specialist into something accessible to ordinary readers. The few who did find that they had the skill to communicate at this level put their careers on the line if they engaged in too much popular writing. There is certainly some evidence that scientists could find the reputation of being a successful popular writer a barrier to advancement. Julian Huxley was warned about this by J. B. S. Haldane when he began his journalistic career and in 1932 it is clear from his correspondence that doubts about his commitment to research had harmed his chances of getting into the Royal Society.[4] J. G. Crowther records the opinion of the physical chemist Sir William Hardy that Haldane himself had done his career harm by writing articles for the daily press.[5] Lancelot Hogben was so concerned that the publication of his *Mathematics for the Million* might harm his chances of election to the Royal Society that he asked Hyman Levy to put Levy's name on the title page.[6]

Reinforcing this direct evidence is the opinion of the younger scientists who moved to the political left in the course of the 1930s and began the campaign for the social responsibility of science. They contrasted their own willingness to engage the public in debate about how science should be used with the previous generation's self-isolation. Hogben himself decried the scientists' refusal to follow the example of Faraday and Huxley and sneered at the half-baked theologizing of James Jeans and Arthur Eddington, which he took to be the only popularization on offer from the previous generation.[7] J. D. Bernal also complained about the ease with which narrowly specialized scientists had slipped back into social and religious conformity once their professional ambitions were realized.[8] C. H. Waddington wrote of a generation of specialists who gleefully accepted a narrowness of focus which excused them from thinking about wider issues.[9] We are left with the impression that the majority of professional scientists were so absorbed in their work that they were afraid to comment on its broader implications, and unwilling to engage in a campaign to educate the public. The few who did venture to address a non-specialist audience were anxious to re-establish the link with religion severed by Huxley and Tyndall in the late nineteenth century.

The picture just outlined is a myth which obscures the true level of involvement by professional scientists in the effort to promote public knowledge of and interest in

4 K. R. Dronamraju, *If I Am to Be Remembered: The Life and Work of Julian Huxley with Selected Correspondence*, Singapore, 1993, 26. Letter from D. M. S. Watson to Huxley, 25 January 1932, Julian Huxley Papers, General Correspondence, Rice University. Watson indicates that several members of the Royal Society committee wanted to see Huxley's latest book to reassure themselves that he was still doing research. He was eventually elected in 1938.

5 J. G. Crowther, *Fifty Years with Science*, London, 1970, 47.

6 G. Werskey, *The Visible College: A Collective Biography of British Scientists and Socialists of the 1930s*, London, 1988, 165–6. Werskey confirms that he was told this story independently by both Levy and Hogben. Hogben got the FRS and published under his own name shortly afterwards.

7 L. Hogben, *Science for the Citizen: A Self-Educator Based on the Social Background of Scientific Discovery*, London, 1938, 9.

8 J. D. Bernal, *The Social Function of Science*, London, 1939, 389–90.

9 C. H. Waddington, *The Scientific Attitude*, 2nd edn, West Drayton, 1948, 81.

science. In the case of the left-wing scientists it was a self-serving myth; they wanted to see their own popular writings as a new initiative inspired by their sense of social responsibility. They ignored the substantial body of non-specialist literature produced by scientists in the early decades of the century which, although often inspired by a very different ideology, did represent a genuine effort to inform ordinary people about the latest developments. They focused on the quasi-theological effusions of Jeans and Eddington because it suited them to argue that the only exceptions to the rule of self-isolation were the religious conservatives.

But what about the evidence that Hogben, Huxley and others found their careers threatened by their involvement in non-specialist writing? We have to be careful how we interpret this evidence. Note that in the case of both Huxley and Haldane it was writing for the daily newspapers that was seen as particularly offensive. There is no doubt that many professional scientists had a horror of reporters and their tendency to sensationalize any discovery. Rutherford at the Cavendish is well known for this attitude. Responsible science correspondents like J. G. Crowther were eventually able to exploit these fears to create a new profession within the newspaper industry. Haldane himself complained about irresponsibly sensational headlines, and saw it as his duty to write more informed material for the press.[10] Crowther, significantly, did not think very highly of Haldane's efforts.[11] Few scientists were in fact able to write at a level suitable for the daily papers, a point I return to later. But this does not mean that the same antagonism was directed at the scientist who wrote a book with an obviously educational purpose, taking the term 'educational' in its broadest sense. Provided one kept such activity limited to a level where it still left plenty of time for research, it was welcomed rather than criticized by the majority of scientists. Only when the popular writing seemed to take over from the research did a scientists' chances of reaching the higher levels of recognition become threatened. Those who maintained a substantial research output were generally pretty safe, as the examples of Eddington, Haldane, Hogben and even Huxley reveal. Of course Huxley did eventually drop out of scientific research, but only after he had got his FRS. A better example of the genuine dangers is the biologist J. Arthur Thomson, who more or less gave up research for teaching and popular writing, and who never did get elected to the Royal Society, though he was knighted on his retirement from his chair at Aberdeen.[12]

Researching this topic, I soon discovered that the major figures of popular science writing, Eddington, Huxley and the like, were only the most visible fraction of a regular industry among professional scientists writing for a non-specialist readership. Most of them have been long forgotten – minor figures teaching at provincial universities who wrote one or two books of the kind that we now find littering the shelves of War on Want bookshops. Some of my best research has been conducted in second-hand

10 J. B. S. Haldane, *The Inequality of Man and Other Essays*, London, 1932, pp. vi–vii.

11 Crowther, op. cit. (5), 83.

12 See Peter Bowler, 'From science to the popularization of science: the career of J. Arthur Thomson', in *Science and Beliefs: From Natural Philosophy to Natural Science* (ed. M. T. Eddy and D. Knight), Aldershot, 2005, 231–48.

bookshops, where I often turned up items by people I had never heard of and who would have been virtually impossible to locate through an academic library catalogue. Never mind the fact that only copyright libraries would bother to obtain and preserve such ephemera. The number of authors who had some professional standing as scientists runs into the hundreds. That means that a significant fraction of the country's scientists must have tried their hands at non-specialist writing at some point or other in their careers. Far from being discouraged, there was positive encouragement both from the scientific community and from the publishers. Studies of what Frank Turner called 'public science' in the early twentieth century confirm that the scientific community still felt itself undervalued by government and industry.[13]

Inspired by the 'Neglect of Science' campaign during the First World War, scientists welcomed any mechanism that would both inform people about science and arouse their interest in it. They might disagree as to how science should be presented, but the exponents of a variety of ideologies were happy to use popular writing as a way of trying to influence the public's attitude. One spin-off from the report of J. J. Thomson's committee on science education in 1918 was the publication of John Murray's 'Science for All' series, one of many efforts by publishers to issue books that would reach beyond the conventional education system direct to the reading public.[14] There was clearly a demand from publishers for manuscripts which conveyed the results of modern research in language that ordinary people could read, and in the first instance they looked to professional scientists to provide material which could be advertised as authoritative and up to date. The scientists were willing to write the appropriate books and articles in the hope of generating wider public interest in and hence support for science.

Professionals and publishers

Before trying to put flesh on the bones of these claims, it is probably necessary to defend against the charge of merely trying to reinstate the so-called 'dominant view' of science popularization. Historians studying popular science in the eighteenth and nineteenth centuries have justifiably rejected the assumption, widely accepted in the mid-twentieth century, that the popularization of science consists of the transmission of a simplified version of research findings to a passive public.[15] The science writer, whether scientist or

13 F. M. Turner, 'Public science in Britain, 1880–1919', *Isis* (1980), **71**, 589–608. See also R. and K. MacLeod, 'The social relations of science and technology 1914–1939', in *The Fontana Economic History of Europe, Volume 5: The Twentieth Century – 1* (ed. C. M. Cipolla), London, 1977, 301–63.

14 Later called the General Science series; the first volume was G. H. J. Adlam, *Chemistry*, London, 1921, reprinted 1929. The series was priced at a modest 3s. 6d. Since prices will form part of the discussion below, readers unfamiliar with the old money should note that there were twenty shillings in the pound and twelve pence in the shilling. Prices are written thus: £1 10s. 6d (one pound, ten shillings and sixpence).

15 R. Cooter and S. Pumfrey, 'Separate spheres and public places: reflections on the history of science popularization and on science in popular culture', *History of Science* (1994), **32**, 232–67. For critiques of the 'dominant view' as applied to modern science see R. Whitley, 'Knowledge producers and knowledge acquirers: popularization and a relation between scientific fields and their publics', in *Expository Science: Forms and Functions of Popularization* (ed. T. Shin and R. Whitley), Dordrecht, 1985, 3–28; S. Hilgartner, 'The dominant view of popularization: conceptual problems, political uses', *Social Studies of Science* (1990), **20**, 519–39.

professional author, simply transmitted an outline of what the scientific community had decided was genuine knowledge to an audience which might be interested in the results but had no control over what they had to learn. This model demonstrably does not work for a period when the distinction between professional and amateur was meaningless, and when those practising science had to respond to the interests of an audience which extended far beyond the ranks of the handful of specialists who could appreciate the most esoteric aspects of what was being studied. But the dominant view was established in the mid-twentieth century precisely because it was over the previous few decades that the distinction between professional and amateur had become more clearly demarcated. With the exception of a few areas such as the natural historical side of the life sciences, it was no longer possible for amateurs to participate in the kind of science that was done in the universities and learned societies. Professionals no longer had to appeal to a wide audience to build their careers.

Popular science did begin to hinge far more directly on the communication of new ideas and techniques to people who could never hope to understand them at the technical level. Theoretical innovations such as relativity were actually marketed to the public as so esoteric that only a handful of experts could understand them. At a more practical level, the technological marvels derived from science were increasingly becoming black boxes for most consumers; the craze for building one's own radio set was very rapidly replaced by off-the-shelf receivers. As far as the science lobby was concerned, the aim was to convince this audience that new developments in science were either intellectually exciting or practically useful, in the hope that this would encourage greater support from government and industry. Scientists no longer had to engage in this activity, but many thought it was useful and some were prepared to give it a try. A generation of well-meaning scientists put a great deal of effort into trying to educate a wider public through the university extension movement and semi-popular writing. Many of the more serious popular science books developed from lecture series, the Royal Institution providing a steady stream of such material by eminent scientists.

So while the dominant view does have rather more plausibility for the period of interest, this does not mean the simple-minded interpretation of it promoted half a century ago is to be defended. There was no unanimity within the ranks of the scientific community, so professional scientists could be found defending contradictory positions both on particular theoretical issues and on the overall significance of the scientific enterprise. Writing for a popular readership was one way of trying to take control of how science would develop as a component of national life. For every materialist like Arthur Keith, E. Ray Lankester or the later generation of left-wing writers, there was a less radical figure such as J. Arthur Thomson, James Jeans or Arthur Eddington seeking a reconciliation with some kind of religious belief.[16] While the left-wingers may have derided or ignored the efforts of the previous generation, because their popularizations were too supportive of the status quo, this does not alter the fact that a great deal of

16 These differences are explored in Peter Bowler, *Reconciling Science and Religion: The Debate in Early Twentieth-Century Britain*, Chicago, 2001.

effective material was published by scientists influenced by these earlier ideologies. The plural 'ideologies' is appropriate because there were significant differences between those who promoted science as the source of new technologies and those who saw it as a route to intellectual and even moral development. The academic elite of the scientific community still hoped to present science as a source of intellectual excitement, and thus focused on theoretical debates and their implications. But the increasingly large number of scientists who gained their livelihood from industry and government tended to stress the practical applications of the latest developments and their potential for improving everyday life and extending the economic power of the empire. This was a spectrum of opinion rather than a polarized split; when they wrote for a wider audience, some elite scientists such as W. H. Bragg were willing to stress both the practical and the moral value of science.

Even if the scientific community had spoken with one voice, it did not have complete control over what was disseminated to the public. Ordinary people may not have been able to influence the scientists directly, but the publishers were commercial enterprises, very sensitive to the demands of their readers. They knew what they wanted. Although they might prefer their books to be written by an acknowledged expert because this lent them a valuable sense of authority, they would only deal with authors who could tailor their writing, both in style and content, to the publishers' perception of what would sell. What the public actually did with the content of books and magazines, once they were published, is a complex story I am not yet in a position to tell. But the publishers represented the public interest in the very real sense that if they misjudged what people would buy they went out of business – and several did. The scientists who wanted to arouse public interest in what they were doing had to deal with the publishers and had to learn the skills needed to address the kind of audience the publishers wanted to reach. This went far beyond learning how to describe science without mathematics and technical jargon. It also involved developing a sense for which aspect of the latest work was most likely to arouse interest. Scientists can well be seen as spin-doctors, with publishers as the arbiters of what kind of spin was most effective.

The other factor guaranteeing that scientists did not have control over what was disseminated is that there was a body of writers who could claim some level of expertise but who were not members of the professionalized research community. As scholars such as Bernard Lightman have shown, throughout the nineteenth century much popular science writing was done by non-specialists with varying degrees of contact with the elite scientific community. Indeed, radicals like Huxley and Tyndall were to some extent forced to take up non-specialist writing because many of these authors were still promoting the kind of natural theology they were trying to destroy. This kind of writing was still being published in the early twentieth century, at least in areas such as natural history. But now a new kind of science writer was beginning to emerge, with no research experience but some training in science and sufficient contact with the scientific community to claim a level of expertise. For instance, a freelance consultant or a school science master might easily turn to writing as a supplementary source of income. The professional science correspondent for the daily newspapers is a later development, pioneered on this side of the Atlantic by J. G. Crowther and

Ritchie Calder in the late 1930s. But in the writing of books and especially magazine articles, freelance experts were already established as rivals to the professional scientist-authors. Simplification and sensationalization in magazines were far greater than that required for books, and had long been a major part of the landscape of popular writing.

Books

In some areas it was still possible for a scientist to follow the route of Lyell and Darwin in the previous century, writing up their material in a form that could be read by any educated person. As the palaeo-anthropologist Arthur Keith noted, books such as his *Antiquity of Man* of 1915 would sell two or three thousand copies over a couple of years, making the author a few hundred pounds in royalties, and then sink without trace.[17] These books would hardly count as popular science. They would be priced at fifteen shillings or a pound and would be bought only by the comparatively well off. We might call this non-specialist writing, representing a distinct though declining niche in the ecological relationship between science and society at the time. But as Keith was well aware, there were books of other kinds to be written which did reach a much wider audience and which can be counted as genuine popularization. There were of course textbooks which could keep up a steady sale to students and eventually make more money than a minor literary success. For reasons of space, textbooks and the related issues of science education will not be discussed here. But as the size of the reasonably well-to-do reading public expanded, there were increasing opportunities for the publication of books that were educational in a less formal way. Given the right price and a successful advertising campaign, a fairly serious book of popular science could reach tens of thousands of readers. Some of these books exploited the press coverage of high-profile developments in areas such as evolution and the new physics. Keith tried to exploit the publicity surrounding his controversial Presidential Address to the British Association in 1927 by having the rationalist publisher Watts issue the text at one shilling (sevenpence in paperback).[18] But the classic examples are the books on cosmology and the new physics by writers such as James Jeans and Arthur Eddington. These were both educational and controversial, and the aggressive publicity campaigns by Cambridge University Press achieved sales in the tens of thousands despite a mid-level price (Jeans's *The Mysterious Universe* sold for 3s. 6d). Michael Whitworth has already given a detailed account of this episode,[19] so we shall now consider less high-profile levels of popular writing.

Such books as are discussed here often do not concern themselves primarily with great theoretical innovations. If new developments come in, they are introduced at the

17 A. Keith, *An Autobiography*, London, 1950, 509.

18 A. Keith, *Concerning Man's Origin*, London, 1927. In fact the project backfired and demand was never high; see Keith, op. cit. (17), 509.

19 M. Whitworth, 'The clothbound universe: popular physics books, 1919–39', *Publishing History* (1996), **40**, 53–82.

end of a substantial survey of traditional knowledge in the area, intended to provide the reader with the foundation that would allow him or her to understand why the new was so exciting. Much of this literature is concerned with the more mundane aspects of science, the interest being derived from the links to technology and industry, or in biology to the popular fascination with the natural world, both domestic and exotic. This was an approach dominated by an ideology which saw science as the handmaiden of industry and empire, not as the source of new and disturbing ideas.

Publishers were anxious to reach out to what they recognized as a steadily expanding market comprising people with a small amount of money to spare and a strong desire to educate themselves about a whole range of topics, including science and technology. Books aimed at this market would be priced as low as sixpence or a shilling and could expect to sell in the tens of thousands. What is significant about most of the educational series launched by publishers (and the much smaller number of popular science magazines) is that in many cases the initiative seems to have come from the publishers rather than the scientists. The claim is repeatedly made in the advertising material issued for these series that a new readership is emerging, demanding access to non-technical descriptions of the latest developments in science. Much of this is of course publishers' hype, especially given that the same adverts invariably claim that the material previously available is either too sensational or too technical for the audience this publisher hopes to reach. But the sheer number of these series and the fact that they were founded throughout the early decades of the century suggests that the publishers did have a sense that more and more people had both the time and the money to invest a shilling a week in a serious non-technical book or magazine. These were people of the sort who read Alfred Harmsworth's *Daily Mail* and bought H. G. Wells's *Outline of History* in their tens of thousands. There was an expansion of the better-off working class, especially after the war, and a genuine desire for educational material. The publishers were anxious to cash in on this market and any author who could write successfully for it was knocking on an open door.

The most active period for the creation of these educational series was the five years before the outbreak of the First World War. The bibliography of the Harmsworth *Popular Science*, itself a product of this outburst of activity, lists around 600 titles, of which nearly 15 per cent were priced at 1s. 6d or less, another 15 per cent at 2s. 6d or three shillings and nearly 40 per cent in the range from five shillings to 7s. 6d. Many of these books belonged to publishers' series, each written and produced to a formula to guarantee uniformity so that the reader knew what to expect. Of the series aimed at adults, the most successful were those aimed at the cheaper end of the market, including Cambridge University Press's Cambridge Manuals of Science and Literature and Williams and Norgate's Home University Library, which began in 1910 and 1911 respectively, both priced at one shilling.[20] There were also series aimed at children, usually in the slightly higher price range because they were better produced and

20 Other important series were: Dent's Scientific Primers (commenced 1909) at one shilling, Milner's XXth Century Science series (commenced 1910) at one shilling, Harper's Library of Living Thought (commenced 1911) at 2s. 6d, Jack's People's Books (commenced 1912) at sixpence and Macmillan's Readable Books in Natural Knowledge (commenced 1913) at 1s. 6d.

illustrated. The publisher Seely, Service & Co. specialized in this market.[21] Some of the series continued after the war and added more titles. There were new series too, including Benn's Sixpenny Library of 1926, very slim paperbacks, and the more adventurous Kegan Paul Today and Tomorrow series at 2s. 6d, which included Haldane's *Daedalus* and Bertrand Russell's *Icarus*. The Rationalist Press Association publisher Watts issued the Forum Series (1926) at sevenpence and began the Thinker's Library in 1932 at one shilling. The Pelican books, issued by Penguin from the late 1930s at sixpence, were probably not quite as original in concept as we imagine from their distinctive covers, although they did offer better value than Benn's little books at the same price.

All these series contained a significant proportion of science. Of the eighty titles listed for the Cambridge Manuals, over half were on scientific topics. The Home University Library, which had the biologist J. Arthur Thomson as its scientific editor, included nearly 150 titles by the late 1920s, of which thirty-five were on science. But what is really significant is that the vast majority of the books, at least in the series aimed at adults, were written by professional scientists. Indeed, the publishers used the professional standing of their authors as a major advertising feature; these were educational books in which people at the cutting edge of research had tried to communicate the latest information and theories in language adapted to the ordinary reader. This is something one might expect from Cambridge University Press, but the fact that their Manuals were written almost exclusively by academic scientists and scholars gives the lie to any suggestion that it was unfashionable for Oxbridge dons to write for a non-specialist audience at this time. Julian Huxley's first important book, *The Individual in the Animal Kingdom*, appeared in this series. In their advertising material CUP quoted press reports stressing that their books were written by 'scholars of eminence' and represented 'the latest word from the expert'.[22] The Home University Library also stressed that every volume was written 'by a recognized authority of high standing', while a 1933 advertisement for the series noted that the books were 'written by experts for amateurs, by specialists with letters after their names for laymen who only have letters in front'.[23] The authors were indeed all qualified people and most had university positions, always indicated under their names on the title page and in catalogues for the series.

The contrast between these books and the spectacular bestsellers written by famous scientists such as Arthur Eddington and James Jeans is substantial. Big names who also had the ability to write well could more or less make their own terms with publishers about both content and royalties (Jeans flirted with other presses in order to up the ante

21 Their publications included the Romance series (1907) at five shillings, the Science of Today series (1909) at six shillings and the Wonder Library (1912) at three shillings.

22 Press reports from the *Scotsman* and the *Glasgow News* quoted in the series catalogue at the end of F. O. Bower, *Plant-Life on Land: Considered in Some of its Biological Aspects*, Cambridge, 1911. Comparatively few volumes in the series contain this catalogue. Bower was professor of botany at Glasgow.

23 First quote from the dustjacket of R. Meldola, *Chemistry*, Williams and Norgate, 1913; second from advertising flyer in the September 1933 issue of *Discovery* magazine (Cambridge University Library copy; see Figure 1).

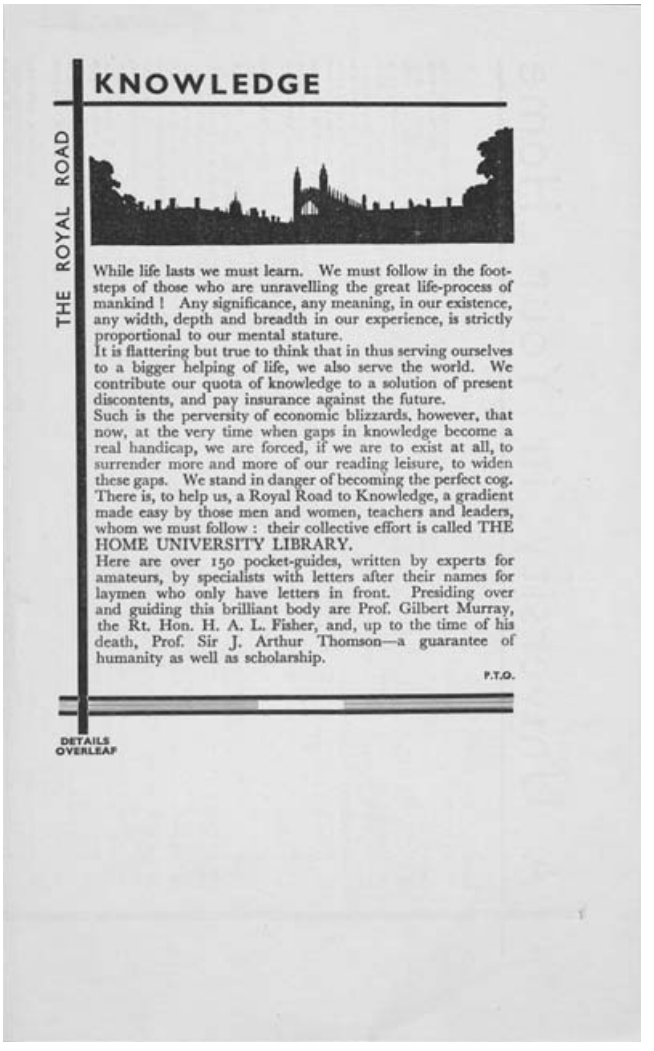


Figure 1. Advertisement for Williams and Norgate's Home University Library, September 1933 (by permission of the Syndics of Cambridge University Library). Note the use of a silhouette of the Cambridge skyline to imply academic respectability.

with CUP). But for the more mundane educational series, the publishers and editors clearly had the upper hand, especially when dealing with relatively inexperienced scientists. They determined which topics were needed and how the material was to be presented. Indeed, the existence of previous volumes in a series probably provided a useful model for a scientist with no prior experience of writing at this level. A scientist-turned-editor like J. Arthur Thomson would select likely candidates to write new books and actively coach them in how to write about their material in an attractive way. Even so, Thomson did not have absolute control over what appeared in the Home University

Library. He tried to commission a book on town planning by his friend Patrick Geddes, but the other members of the editorial board turned the proposal down.[24] This was an industry driven very much by what the publishers thought would sell; to succeed in it a scientist had to develop an acute sense of what would appeal to the publisher and hence, by implication, to the public.

The same is true for the series which offered books with a higher proportion of entertainment value, in addition to information. These were often targeted at children and advertised as suitable for Christmas presents and school prizes. The publisher Seeley, Service & Co. specialized in this market, producing series with titles such as *The Wonders of Modern Chemistry* and *The Romance of Modern Electricity*. A few of these books were written by professional scientists, but here the realm of the 'expert' expanded to include people who often had some sort of qualification but were not involved directly in scientific research. One of Seeley, Service's most prolific authors was Charles R. Gibson, who had no scientific training whatsoever, writing his books between 5 a.m. and 8 a.m. before starting his day-job as manager of a Glasgow curtain factory. But Gibson took his science seriously and regularly consulted friends who taught in local colleges and at universities. In 1910 he was elected to the Royal Society of Edinburgh, and the postnomial 'FRSEd' thereafter appeared routinely on his title pages as an indication of his status as an expert. Another equally prolific author of the same type of book was 'Professor' A. M. Low, the title invariably stressed although it was justified only by a brief spell as honorary assistant professor of physics at the Royal Artillery College. In fact Low was a freelance radio engineer, inventor and author whose writing would have provided a significant fraction of his income. Lord Brabazon later recalled how annoyed academic scientists were at Low's use of the title 'professor' – a clear indication in this case of a tension between the elite and those who focused exclusively on applied science.[25]

This fluidity in the attribution of expertise is even more obvious in areas where the boundaries between professional and amateur were still not clearly defined. Books on natural history were extremely popular, and some professional scientists were able to tap into this market. J. Arthur Thomson is an obvious example, others included W. P. Pycraft, of the Natural History Museum, and Ernest Boulanger, who superintended the aquarium of the Zoological Society. Geology, palaeontology and palaeoanthropology also offered lucrative opportunities, exploited actively by Arthur Keith and others. But in these areas there were many amateurs with serious levels of expertise which could rival that of the professionals, and there were hundreds of books published by men (and the occasional woman) who could proclaim themselves fellows of the Geological Society, the Linnean Society or the Royal Entomological Society, or who could claim membership of the British Ornithological Union. The relevant postnomials were invariably given on title pages and in advertisements, suggesting once again that

24 There is much correspondence relating to Thomson's activities as editor and author in the Patrick Geddes papers held at both the National Library of Scotland and Strathclyde University. See also Bowler, op. cit. (12).

25 Lord Brabazon of Tara, 'Introduction', in U. Bloom, *He Lit the Lamp: A Biography of Professor A. M. Low*, London, 1958, 1.

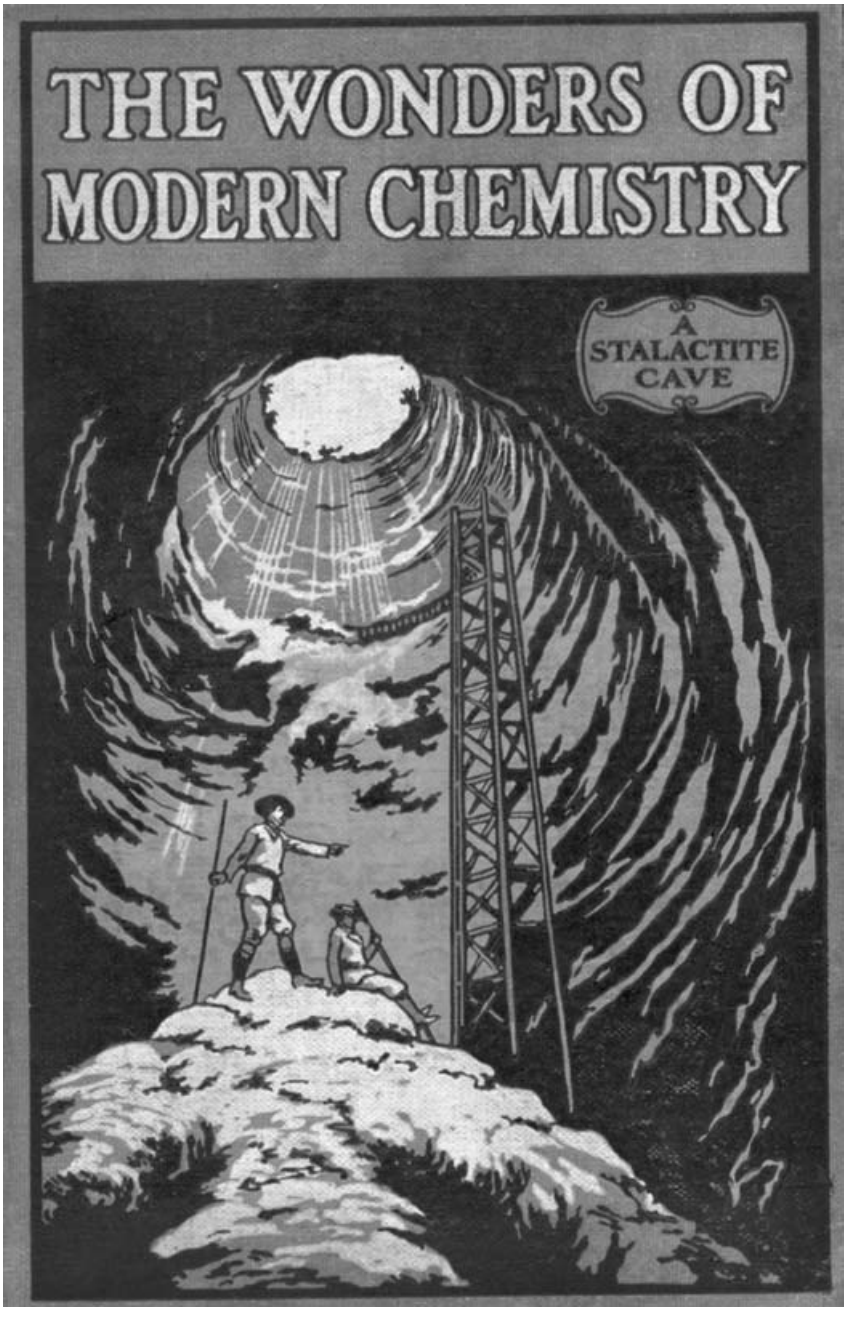


Figure 2. Front cover of James C. Philips, *The Wonders of Modern Chemistry* (London, 1913) showing a stalactite cave. A typical example of Seeley, Service's books. The author was professor of physical chemistry at Imperial College, London.

https://doi.org/10.1017/S000708740600793X Published online by Cambridge University Press

evidence of expertise was valued by publishers as an indication that what they were providing carried some sort of authority. The same fluidity still existed to some extent in astronomy. Although they could not engage in the kind of cosmological research now conducted at the big observatories, there were many skilled amateurs who could write about it with confidence and still provide the kind of popular survey of the stars and planets much beloved by the book-buying public.

Serials

A similar situation can be found in serial publications. This was a time in which publishers routinely issued large-scale works in weekly or fortnightly parts, accumulating over a year or more into a substantial body of material which could be stored as book-length volumes in patented self-assembly bindings. The material was often issued afterwards in a regular book form. The classic example of this approach to publishing is H. G. Wells's *Outline of History* of 1920, which sold like hot cakes and made its author £60,000 – a considerable fortune at the time. Wells had assembled a team of specialist advisers to help him prepare the text, including E. Ray Lankester, who oversaw the introductory material on evolution and human origins. Wells and his son Gip (a Cambridge-trained biologist) then collaborated with Julian Huxley to write *The Science of Life*. The letters between them, now published, reveal the tensions which arose between the professional author and the scientists who were, in effect, being taught the trade.[26] Published by Harmsworth's (Lord Northcliffe's) Amalgamated Press in 1929–30, the series was not as successful as *The Outline of History*, but the advances were enough for Huxley to abandon his academic career to concentrate on the project.

There were other serial publications on scientific themes with less well-known contributors. The Harmsworth *Popular Science* of 1912–13 was a blatant celebration of science and technology in the service of the empire. It employed mostly freelance technical experts and writers, although a few professional scientists and medical men with established reputations as authors were involved. Best known was Gerald Leighton, the Edinburgh professor of pathology.[27] A more serious Harmsworth product was their *Self-Educator* of 1905–7, reissued in 1913, and this did have contributions from a wide range of professional scientists and engineers.[28] The Harmsworth/Northcliffe stable continued its policy of encouraging participation by both professionals and less-established experts in the post-war years with *Our Wonderful World*

26 See the series of letters in J. S. Huxley, *Memories*, London, 1970, Chapter XII; and D. C. Smith (ed.), *The Correspondence of H. G. Wells, Volume 3: 1919–1934*, London, 1998, 201–75 passim. The book derived from the series is H. G. Wells, Julian Huxley and G. P. Wells, *The Science of Life*, London, 1930.

27 A. Mee (ed.), *Popular Science*, 7 vols, London, 1912–13.

28 A. Mee (ed.), *New Harmsworth Self-Educator*, London, 1913. Professional scientists who contributed included J. Arthur Thomson, Conwy Lloyd Morgan, Arthur Keith, A. T. Schofield, Sir Herbert Maxwell, Sylvanus Thomson, J. R. Ainsworth-Davis and J. W. Gregory. The ageing Alfred Russel Wallace also contributed.

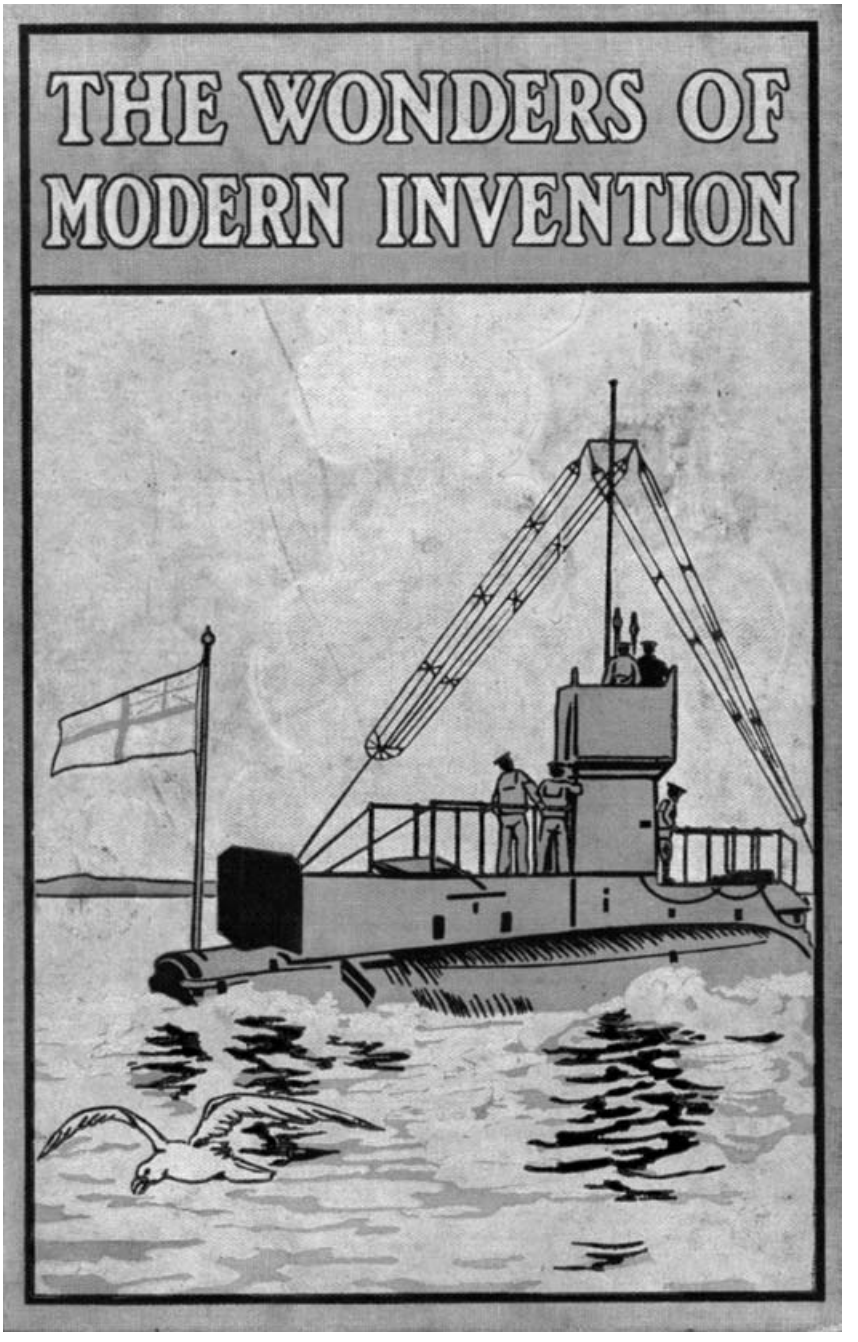


Figure 3. Front cover of Archibald Williams, *The Wonders of Modern Invention* (London, 1914), showing a submarine. Another, typical example of the publisher Seeley, Service & Co.'s books aimed mainly at teenage boys.

of 1931,[29] the *New Popular Educator* of 1933 and the *Encyclopedia of Modern Knowledge* of 1936–7. The *New Popular Educator* proclaimed that its fifty easy courses of instruction were expressly prepared 'by Experts in the Principal Branches of Modern Knowledge' and the editor indicated that so many eminent people had contributed or been consulted that it was impossible to publish a complete list of names.[30] The *Encyclopedia of Modern Knowledge* claimed '170 writers of authority', of whom the scientists included James Jeans, Arthur Keith and Julian Huxley.[31] This policy changed in the late 1930s with the publication of *The Popular Science Educator*, which despite its title was aimed far more at entertainment than enlightenment and focused almost exclusively on applied science. This was edited by Charles Ray, who seems to have had no scientific qualifications, and the series provided no information on any technical experts who might have been consulted. Significantly, Ray edited a number of books on applied science for Harmsworth aimed directly at young boys.[32] At this level, skill at writing very short articles aimed at readers with a limited attention span was what was needed, a genre closer to that of the more popular magazines to be discussed below.

Other publishers were also involved with serial publications, often involving significant input from professional scientists. Hutchinson's *Animals of All Countries* of 1923–4 included material from many 'leading specialists', several of whom were in fact professionals on the staff of the Natural History Museum and the Zoological Society.[33] The same publisher's *Splendour of the Heavens* was edited by T. E. R. Phillips, the secretary of the Royal Astronomical Society, and all of the contributors listed on the title page were identified with the postnomial 'FRAS'.[34]

Magazines

In the case of periodicals, we find a variety of publications aimed at different readerships and hence with different policies on the need for demonstrable expertise in their articles. I concentrate on magazines aimed explicitly at the popular science market, but it is worth noting that the better-quality general and literary magazines would

29 J. A. Hammerton (ed.), *Our Wonderful World: A Pictorial Account of the Marvels of Nature and the Triumphs of Man*, London, 1931–2 (30 fortnightly parts). Over half of the many authors listed were professional scientists, including J. Arthur Thomson, J. W. Gregory, E. G. Boulanger, E. N. da C. Andrade, A. Smith Woodward, H. H. Turner and Sir William Bragg.

30 J. A. Hammerton (ed.), *New Popular Educator: The University in the Home*, London, 1933–4 (52 weekly parts). The quotation is from the cover page; the editor's opening remarks are on p. 1.

31 J. A. Hammerton, *Encyclopedia of Modern Knowledge*, London, 1936–7 (40 fortnightly parts), quotation from the front cover of Part 1, which also features as backdrop the new building of the University of London.

32 Charles Ray (ed.), *The Popular Science Educator*, London 1935–6 (52 weekly parts); see also, for instance, *idem* (ed.), *The Boy's Book of Everyday Science*, London, 1936.

33 F. A. Bather *et al.*, *Animals of All Countries*, London, 1923–4 (24 fortnightly parts). In addition to Bather, other professional biologists involved include E. G. Boulanger, W. T. Calman, F. Martin Duncan, M. A. C. Hinton and W. P. Pycraft.

34 T. E. R. Phillips (ed.), *Splendour of the Heavens: A Popular Authoritative Astronomy*, London, 1923–4 (24 fortnightly parts).

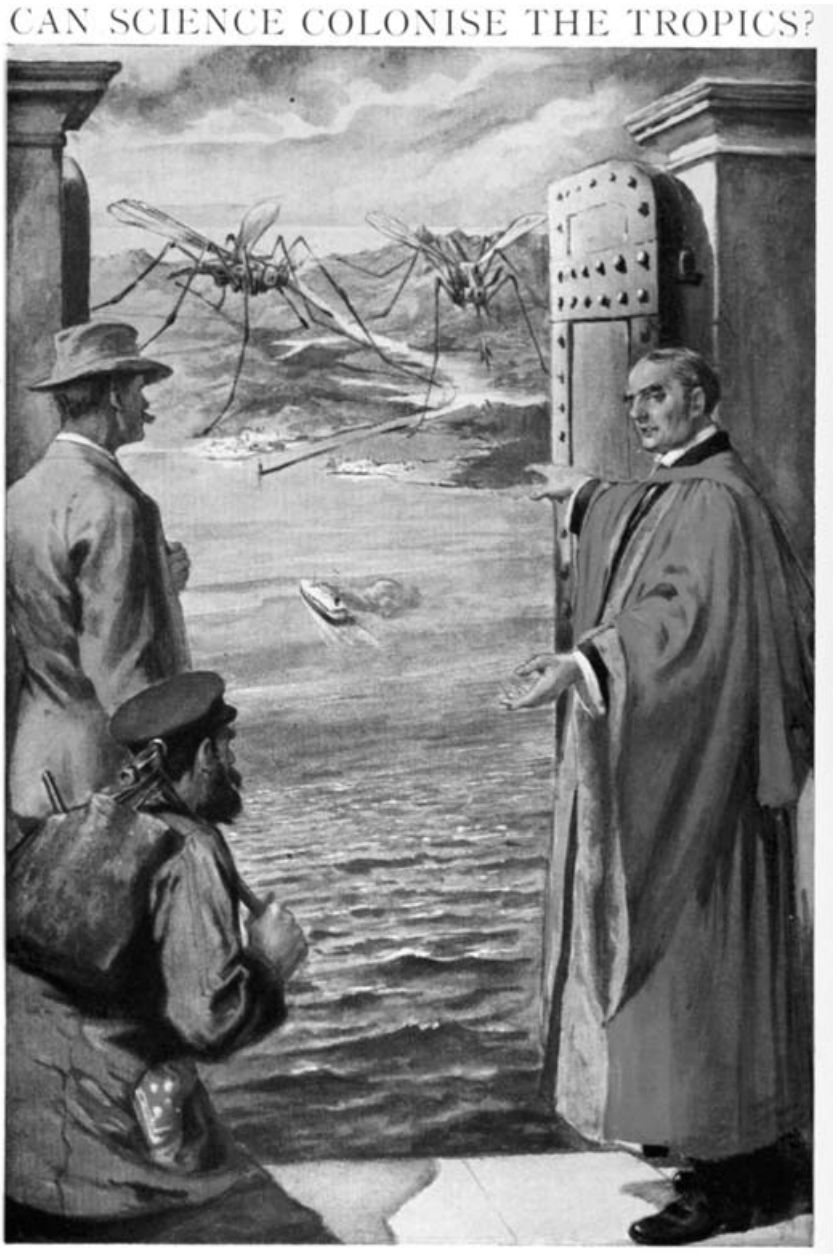


Figure 4. 'Can science colonise the tropics?' Full-page illustration from *Popular Science* (edited by Arthur Mee) (1911), **1**, facing p. 233. A figure in academic robes (presumably Sir Ronald Ross, who is mentioned in the text but not the original caption) invites white explorers and colonists into the tropics now that the scourge of malaria has been defeated. The Panama Canal is in the background.

occasionally open their pages to leading scientists willing to write on the broader implications of their work. Figures such as Eddington, Huxley and Keith wrote occasionally for the monthlies, along with members of the older generation such as Oliver Lodge. But outsiders from the literary community could also comment on science in the periodical literature. One science writer who made a name for himself, initially by writing in the *Athenaeum*, was J. W. N. Sullivan. Although he became a member of the Bloomsbury literary set, Sullivan had initially had a scientific education while working for a telegraph company. He was interested in developing parallels between the artistic and scientific world views and was particularly successful in explaining the more counterintuitive aspects of relativity to a lay audience. His articles on this and other topics were collected in a successful book, *Aspects of Science*. Another book, *Three Men Discuss Relativity*, was widely hailed as one of the best introductions to the topic.[35] Like Crowther in the later 1930s, Sullivan helped to create the profession of the science writer who had some training in the field but who abandoned research for serious non-specialist writing.

Like the better-class monthlies, the BBC too offered 'establishment' scientists a platform in its early years, and published their talks in the *Listener*. The Oxford chemist Alexander Smith Russell wrote a regular column on science. However, another regular contributor was the journalist Gerald Heard, who (like Sullivan) shows how a figure from the literary world could take up a regular interest in science and become accepted as an authority.[36] Even a weekly such as the *Illustrated London News* would take the occasional article from a scientist able to write on a topical issue, including Keith writing on new human fossils. In fact the *Illustrated London News* carried a regular feature called 'Science jottings', later 'The world of science', written throughout the inter-war years by W. P. Pycraft of the Natural History Museum. Not surprisingly, natural history topics formed a large part of his output, although he did make occasional efforts to cover wider developments in science.

There were also magazines aimed specifically at those interested in science. *Nature* was by now approaching its modern format as a journal for the scientific community and was unlikely to be read by anyone who was not a trained scientist. John Murray's *Science Progress*, restarted in 1906, was also written by and aimed mostly at scientists, but it offered review-type articles aimed beyond the world of the specialist researcher. An editorial in the first volume hoped that material at this level would appeal to science teachers, students and some interested members of the public.[37] At five shillings a month, however, it was hardly likely to attract subscriptions from non-professionals.

35 J. W. N. Sullivan, *Aspects of Science*, London, 1923; *idem*, *Three Men Discuss Relativity*, London, 1925. There is a short biography by Charles Singer in J. W. N. Sullivan, *Isaac Newton, 1647–1727*, London, 1938. On Sullivan's work see M. Whitworth, 'Pièces d'identité: T. S. Elliot, J. W. N. Sullivan and poetic impersonality', *English Literature in Transition* (1996), **39**, 149–70; and David Bradshaw, 'The best of companions: J. W. N. Sullivan, Aldous Huxley, and the new physics,' *Review of English Studies* (1996), **47**, 188–206 and 352–62. See also Whitworth, op. cit. (19).

36 Heard's work was summarized in his *This Surprising World: A Journalist Looks at Science*, London, 1932.

37 Unsigned editorial, *Science Progress* (1906–7), **1**, 1–2. The editors were N. H. Alcock and M. D. and W. G. Freeman of the Physiology Laboratory, London University.

Figure 5. 'The proud bulwarks of Britannia'. Full-page illustration from *Popular Science* (edited by Arthur Mee) (1911) **1,** facing p. 267. Here the imperialist message of the Harmsworth publishing house is even more explicit than in Figure 4.

At the more popular level there was the magazine *Knowledge*, founded by the astronomer and popular science writer Richard Proctor, but this closed in 1917 under the pressure of wartime austerity. It drew a significant amount of its content from active scientists, and its advertisements certainly stressed the eminence and authority of its writers.[38]

The demise of *Knowledge* left a gap in the market soon filled in the post-war years. But as with book publishing, there were two ways of trying to make a popular science magazine work. One was to stress the practical applications of science, appealing to the sort of reader who might be fascinated by new developments in radio, aeronautics and the like. The other was to appeal to the intellectual excitement generated by new discoveries and major theoretical innovations. The latter approach was tried by the founders of *Discovery*, established in 1920 as another spin-off from J. T. Thomson's committee and the 'neglect of science' lobby. This sold for sixpence a month, soon raised to a shilling, and tried to stress the romantic appeal of exploration and discovery in science, geography, archaeology and anthropology. The aim was to treat science as a source of intellectual and even moral development for the enquiring mind, offering an alternative to the all-too-frequent extolling of its link with technology in much popular writing. In *Discovery*'s early years the sciences occupied only about half the content, but the proportion of science steadily increased in the course of the 1930s. The authors were mostly active researchers and academics. The magazine prided itself on persuading experts and those who were 'inside' the subject to explain their work to a non-specialist audience in an exciting manner.[39] Significantly, though, when it closed down temporarily after the start of the Second World War the editor, C. P. Snow, admitted that it had never made a profit. He noted that it had always been liked by the scientists and so had probably tended to go over the heads of most ordinary readers. Snow felt that by this time it had indeed become difficult to find specialists with the time, inclination and skill to describe fundamental scientific advances in lay terms.[40]

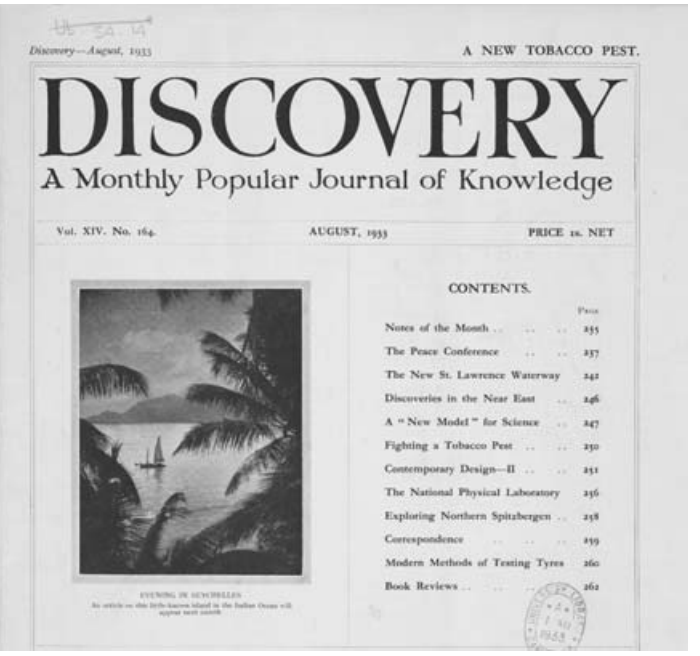
Founded a few months before *Discovery*, the rival magazine *Conquest* initially stressed the practical side of scientific innovation and the links with invention and industry. It was aimed explicitly at the 'armchair' reader who wanted to know what was going on in these areas, and included features of the kind that would appeal to those who wanted to know how science and technology would affect their own lives. But *Conquest* proclaimed its links with the scientific and technical community; it stressed that its articles would take the reader into the laboratory and the workshop so they would learn 'what scientists are really talking about'.[41] There were calls for articles

38 See the advertisement on the front cover of Vol. 1 of *Science Progress* (1907), which quotes various press notices including the *Athenaeum*: 'The articles are all from the pens of authors eminent in their own lines.'

39 A. S. Russell, 'Editorial notes', *Discovery* (1920), **1**, 3–4. As already noted, Russell wrote frequently for the *Listener*. On the origins of *Discovery* see A.-K. Mayer, '"A combative sense of duty": Englishness and the scientists', in *Regenerating England: Science, Medicine and Culture in Inter-War Britain* (ed. C. Lawrence and A.-K. Mayer), Amsterdam, 67–106.

40 C. P. Snow, 'Editorial: the end of discovery', *Discovery* (1940), NS, **3**, 117–18. The magazine opened up again in 1944 under a new publisher and became distinctly less 'popular' in its content.

41 P. W. Harris, 'The editor's chair: a short talk on the aims and ideals of conquest', *Conquest* (1919), **1**, 18.


Discovery—August, 1933

A NEW TOBACCO PEST.

DISCOVERY

A Monthly Popular Journal of Knowledge

Vol. XIV. No. 164. AUGUST, 1933 PRICE 1s. NET

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Figure 6. Front cover of *Discovery*, August 1933 (by permission of the Syndics of Cambridge University Library). Note the photograph of an exotic scene in the Seychelles, which is advertising an article to appear in the next issue – *Discovery* frequently contained articles on geography, anthropology and archaeology, as well as on scientific discovery.

to be written by anyone who could provide this sort of information, and a significant proportion of the articles were written by professional scientists, generally those whose names would be familiar because they were already experienced writers at the non-specialist level. Many articles were, however, anonymous, although the authors clearly had some degree of familiarity with the technical material they were reporting. If anything, the magazine seems to have become more serious in its approach over the next few years, suggesting that manuscripts were coming in more from people with technical training than from journalists or professional writers. After changing its name to *Modern Science* it was absorbed into *Discovery* in 1926.

If *Conquest* abandoned its original intention to be a genuinely popular magazine, that slot in the market was taken up ten years later by the creation of *Armchair Science*. As the title implied, this was aimed at the reader who wanted a quick and relatively painless guide to modern scientific and technical developments. It was edited by an engineer, A. Percy Bradley, and the technical adviser was the ubiquitous Professor A. M. Low, who later took over as editor. Early editorials claimed that there was a lack of material written at this genuinely popular level and insisted that since the right kind of non-specialist account could not be written by a technician, the editorial 'we' would do it for him.[42] The articles would thus not be written by scientists, nor would the

42 Anon. [presumably A. P. Bradley], 'Ourselves', *Armchair Science* (1929), **1**, 11.

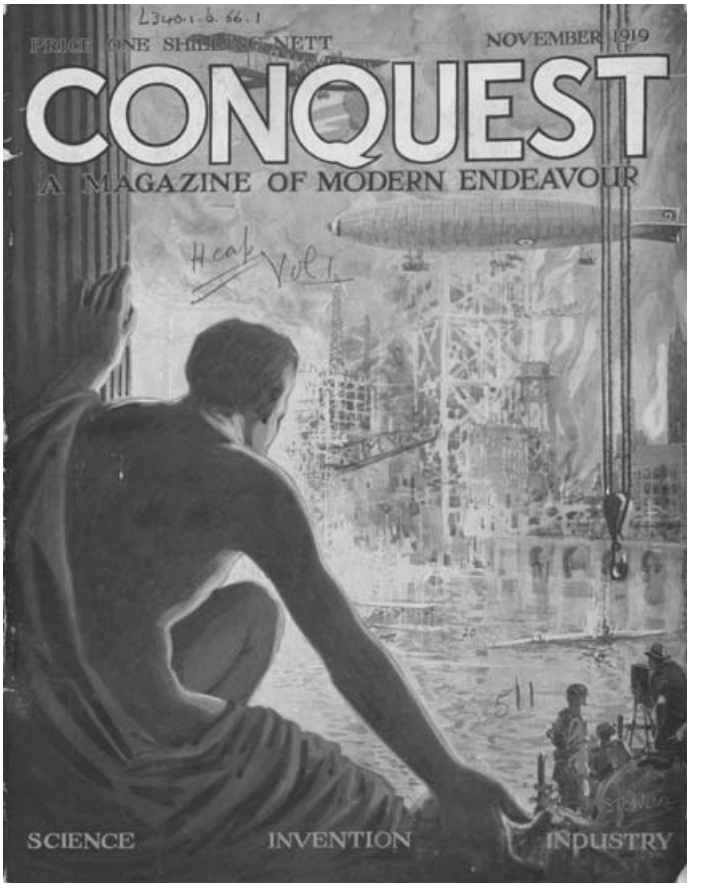

Figure 7. Front cover of *Conquest*, November 1919 (by permission of the Syndics of Cambridge University Library). The figure looks out over a scene of industrial activity.

magazine be aimed at the scientific community – this was to be science at the level of jazz, rather than of Beethoven.[43] Not surprisingly, the magazine seldom featured articles by the big names of science, not even those who had a reputation for being able to write for the non-specialist reader, and many were published anonymously. Still insisting that its goal was to translate science into plain English, the magazine reduced its monthly price in the 1930s from one shilling to sixpence and then changed to a pocket size for the convenience of those who wanted to read it on the train or the bus. It survived in this format until closed down by the paper shortages of 1940.

The audience at which *Armchair Science* was aimed was that of the popular magazine or daily newspaper, rather than the more serious readership which sought education and was prepared to put a bit of effort into obtaining it. This was entertainment as much as instruction, and it was far more difficult for trained scientists to

43 Anon. [Bradley], 'Science and the public', *Armchair Science* (1929), **1**, 71.

Figure 8. Front cover of *Conquest*, October 1923 (by permission of the Syndics of Cambridge University Library). Note the seemingly classical surroundings of the boy wearing headphones.

provide the kind of material needed to satisfy these readers. As science got more technical, and the attention span of the reader more limited, the specialist was not the person best fitted to translate the esoteric content of science into readable copy. In his survey of this kind of popular science writing, Peter Broks draws attention to the words of the editor of *Cassell's Magazine*, W. T. Stead, who in 1906 wrote,

> In editing a newspaper, never employ an expert to write a popular article on his own subject, better employ someone who knows nothing about it to tap the expert's brains, and write the article, sending the proof to the expert to correct. If the expert writes he will always forget that he is not writing for experts but for the public, and will assume that they need not be told things which, although familiar to him as ABC, are nevertheless totally unknown to the general reader.[44]

44 W. T. Stead, 'My system', *Cassell's Magazine* (August 1906), 297; see P. Broks, *Media Science before the Great War*, London, 1996, 35.

https://doi.org/10.1017/S000708740600793X Published online by Cambridge University Press

Figure 9. Front cover of *Armchair Science*, April 1929 (by permission of the Syndics of Cambridge University Library). A simple but effective way of presenting the magazine's aim of linking the ordinary reader to the world of the laboratory.

It was not impossible for the professional scientist to write at this level, but few were prepared to develop the skill. E. Ray Lankester's 'Science from an Easy Chair' articles for the *Daily Telegraph* were justly famous, and J. Arthur Thomson wrote a weekly column for the *Glasgow Herald* through the 1920s. But they had the advantage of writing mostly about natural history, although both slipped in the occasional discussion of a more serious topic. Julian Huxley's letters reveal how difficult he found it to follow up the initial breakthrough provided by the popular press's interest in his experiments with growth hormones.[45] The rewards in terms of public exposure were great: Edward Slossen told Huxley that if he could write five hundred words on a topic for the

45 See the letter from Campbell Stuart, editor of the *Daily Mail*, to Huxley, 23 February 1920, explaining that the piece he had written for the paper was too difficult for the ordinary reader, in Julian Huxley papers, Rice University, General Correspondence.

American newspapers he could reach two million people, whereas a thousand-word magazine article on the same topic would only reach a hundred thousand.[46] But few scientists had the time or the skill to provide this sort of material; as we have seen, if they did stoop to this level they risked professional ostracism. Keith wrote for the *Illustrated London News* and occasionally for the daily papers, helped by the fact that human fossils were always big news, but he was viciously criticized for this by W. J. Sollas.[47]

What we see here parallels the situation in book publishing. The more serious periodicals welcomed material written by professional scientists because this conferred an authority which appealed to readers looking for an informed insight into the latest developments. Popular magazines and newspapers were concerned more with entertainment than with education. Here authority was of little concern, while the ability to write briefly, simply and with some element of sensationalism was paramount. The professional scientist had little to offer at this level unless he was a household name and could adapt his writing style to this level. Small wonder that the more popular end of the market was dominated by writers who came from outside the scientific community. One suspects, however, that many of the anonymous authors had some contact with working scientists. Like Charles R. Gibson, they would have friends in science and industry who could feed them information and advice. Like Gibson once again, they would probably not have been full-time writers, but would have combined writing with another more secure source of income.

Only in the later 1930s did the full-time professional science writer emerge. J. G. Crowther, who had gained some scientific training at the Royal Navy's Gunnery School during the war, initially added his work as science correspondent for the *Manchester Guardian* to his main job in science publishing.[48] Ritchie Calder began as a *Daily Herald* journalist who, typically, had no interest in science whatsoever, but unlike most others he took his science assignments seriously enough to gradually gain the confidence of the scientific community.[49] Both began writing books in addition to articles, joining the ranks of the many anonymous figures who had satisfied the demand for the more entertaining style of popular science writing over the previous decades.

By the 1940s there were enough full-time or nearly full-time science writers to form an embryonic professional community. The way was being paved for the modern situation in which a small number of high-profile media-savvy scientists compete and sometimes collaborate with professional science writers to satisfy the publishers' demand for popular science books and articles. What seems to have dropped out of the situation in the later twentieth century is the more serious kind of educational popular science which had been the mainstay of the professional scientists' involvement in the field. Such material would look too much like a cut-down textbook for the modern

46 Slossen to Huxley, 7 December 1921, Julian Huxley papers, Rice University, General Correspondence.

47 See the letters from W. J. Sollas to Robert Broom, May and July 1925, quoted in G. H. Findlay, *Dr. Robert Broom, FRS: Palaeontologist and Physician, 1866–1951*, Cape Town, 1972, 53.

48 Crowther, op. cit. (5)

49 See Sir Frederick Gowland Hopkins's foreword to R. Calder, *The Birth of the Future*, London, 1934.

reader. Now, if the average scientist has any ambition to write non-specialist material, it will probably be aimed directly at the textbook market. With the exception of the few 'big names', the attraction of the professional scientists' authority no longer excites publishers' interest. They want the right kind of writing, and that is what the average scientist can no longer supply because he or she simply does not have the time to develop the relevant skills. The decline of the market for educational non-specialist science literature has broken the link between the professional science community and the publishing industry which flourished in the social climate of the early twentieth century.

Popular writing of history of science

This leads to some final remarks on the relationship between the academic community and the publishers in our own area, the history of science. This is not the first time a Presidential Address has been used to comment on this topic – John Brooke did so, for example, in 1997.[50] But the situation has moved on since then. What David Miller has called 'the Sobel effect' has become a matter of even more serious concern.[51] Since the publication of Dava Sobel's *Longitude* in 1995 publishers have discovered that a well-told story about a scientific discovery or a technical development can become a best-seller. But academic historians of science are not writing these best-sellers and some of them are not very happy about the fact that journalists and professional writers seem to have commandeered the medium and the profits. Miller's subtitle tells it all: 'how multitudes of popular writers pinched all the best stories in the history of science and became rich and famous while historians languished in accustomed poverty and obscurity'. Two complaints are made. First, that the popular writers distort the subject to tell a good story, often reinstating exactly those myths about heroic single-handed discoverers that historians have laboured hard to dispel; second, that to the extent that they do use the work of academic historians of science, they borrow it often without proper acknowledgement, leaving the academic unable to publish, or at least cut off from any hope of reaching a wider audience. Another presidential predecessor, Hugh Torrens, has a tale to tell in this respect concerning his work on William Smith.[52]

What, then, are we going to do about it, assuming we should be trying to do anything about it in the first place? After all, very few working scientists now engage in popular science writing and most are quite happy to leave the difficult task of non-specialist communication to the professional writers. The situation of the early twentieth century no longer obtains, because the difficulty of communication at this level has increased with the technicality of the science and most scientists have neither the time nor the inclination to acquire the necessary skills. But in theory the history of science should be

50 J. H. Brooke, 'Does the history of science have a future?' *BJHS* (1999), **32**, 1–20.

51 D. P. Miller, 'The "Sobel Effect": the amazing tale of how multitudes of popular writers pinched all the best stories in the history of science and became rich and famous while historians languished in accustomed poverty and obscurity, and how this transformed the world. A reflection on a publishing phenomenon', *Metascience* (2002), **11**, 185–200.

52 See Miller, op. cit. (51) for the comments on Simon Winchester's book on Smith.

in a position closer to that of the earlier generation of scientists: the material need not be so technical and historians are, after all, supposed to be able to write up their research in normal prose which should be readable by anyone. Why, then, are we not doing it in a way that the publishers find exciting? Some academics, of course, do not want to write accessible prose, preferring instead the language of the ivory tower. They presumably have no wish to challenge popular writers for public attention. But many of us do want to write for a wider audience and have spent time and effort learning how to do so; thus we get complaints of the kind that David Miller has articulated.

There has always been a kind of intermediate level of academic history writing of the kind aimed at undergraduates, which can double as a semi-popular introduction to the field. Several of my own books fall into this category. This style of writing forms a close parallel to the kind of popular science writing by early twentieth-century scientists discussed above. But the modern best-sellers did not arise from this source. Like the more entertaining earlier genre of popular science writing and virtually all modern contributions to that field, the 'Sobel effect' books come from the pens of professional storytellers. The publishers, surprised as anyone at the success of *Longitude*, suddenly found they had an entirely new market on their hands. The writers who seemed immediately able to satisfy it were the journalists, not the academics – a very different situation to that of the popular science publishers of the early twentieth century, who at least had the big scientific names of the previous generation to serve as models. So it has been the journalists, not the more articulate of the academic writers, who have continued to gain the publishers' attention. Can academics tell a good story without betraying their scholarly principles, or is there something about the more convoluted historiography of the modern history of science that makes it virtually impossible to use as the basis for good storytelling? Is there a fundamental difference between the semi-popular academic book in history and the Sobel-style of writing?

In principle, I don't think there is. But there can be no doubt that publishers have a very clear idea of what they want, and not all the points the academics want to get across can be formulated in the appropriate way. Some academics have written best-sellers – Adrian Desmond, Jim Moore and Janet Browne writing on Darwin, for instance. Jon Turney's Revolutions in Science series for Icon is now giving many other academic historians a vehicle for promoting their work at a popular level.[53] But there is a formula at work here. Desmond, Moore and Browne were writing biographies of Darwin, while most of the Icon books have a single figure around whom their story is built. Everything is now personalized and the publishers are convinced that only biographical studies work for the public. I write with some feeling on this, having had a proposal for a book on evolution and religion turned down by Icon precisely because it did not fit this mould. The book will now come out with Harvard University Press. Biography is a perfectly legitimate genre of historical writing, but it cannot be used for all purposes, as the example of my book on evolutionism and religion shows. Yet surely such wider stories are worth telling and it will be a shame if publishers' obsession with

53 For an assessment of the books in this series see A. Fyfe and P. Smith, 'Telling stories', *BJHS* (2003), **36**, 471–6.

personalities shuts off every other avenue by which historians might seek to present more expansive narratives to the public. But the point is there, now as in the early twentieth century. It is the publishers who are the gatekeepers; scientists and historians have to learn how to deal with them if they want to reach the public. Let us hope that, with some flexibility on both sides, modern historians of science can be as successful as were Eddington, Jeans and Huxley in getting their message across. If the British Society for the History of Science can help to bring this about, it will be doing a worthwhile job.